Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A fuel properties estimating apparatus for an internal combustion engine, the fuel properties estimating apparatus comprising:

a controller to determine an estimated component concentration of a component in a fuel for the engine in accordance with an actual air fuel ratio of the engine, the controller being configured to perform a plurality of estimating operations to determine the estimated component concentration at predetermined timings after an engine start of the engine[[.]],

wherein, in each of the estimating operations, the controller calculates the estimated component concentration by using a characteristic in which the estimated component concentration is increased in proportion to an air-fuel ratio correction quantity which is determined from the air fuel ratio.

2. (Original) The fuel properties estimating apparatus as claimed in Claim 1, wherein the controller is configured to perform first and second estimating operations to determine the estimated component concentration in accordance with the actual air fuel ratio, respectively, at first and second estimating timings after the engine start;

the first estimating timing being a timing so determined that the first estimating operation is performed when fuel supplied to the engine is almost switched from fuel remaining in a fuel line from a fuel tank to the engine at the time of the engine start, to fuel existing in the fuel tank at the time of the engine start; and

the second estimating timing being a timing so determined that the second estimating operation is performed when disturbance to an air fuel ratio control based on the actual air fuel ratio is settled down.

3. (Original) The fuel properties estimating apparatus as claimed in Claim 2, wherein the controller is configured to perform the first estimating operation when a fuel injection accumulated quantity after the engine start becomes equal to a predetermined value which is so determined that the first estimating operation is performed when fuel supplied to the

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engine is switched by a predetermined percentage from the fuel remaining in the fuel line at the time of the engine start, to the fuel existing in the fuel tank at the time of the engine start.

4. (Original) The fuel properties estimating apparatus as claimed in Claim 3, wherein the controller is configured to perform the second estimating operation at the expiration of a predetermined time interval after the first estimating operation.

5. (Original) The fuel properties estimating apparatus as claimed in Claim 1, wherein the controller is configured to calculate a fuel supply accumulated quantity after the engine start, and to determine a first estimating timing of a first estimating operation to determine the estimated component concentration in accordance with the fuel supply accumulated quantity after the engine start.

6. (Original) The information system as claimed in Claim 5, wherein the controller is configured to perform a second estimating operation to determine the estimated component concentration at the expiration of a predetermined time interval after the first estimating operation.

7. (Original) The fuel properties estimating apparatus as claimed in Claim 6, wherein the predetermined time interval is equal to or longer than 15 minutes, and equal to or shorter than 30 minutes.

8. (Original) The fuel properties estimating apparatus as claimed in Claim 5, wherein the controller is configured to compare the fuel supply accumulated quantity with a predetermined value corresponding to a predetermined percentage of fuel remaining in a fuel pipe from a fuel tank to the engine; and to perform the first estimating operation when the fuel supply accumulated quantity becomes equal to the predetermined value.

9. (Original) The fuel properties estimating apparatus as claimed in Claim 8, wherein the controller is configured to measure an elapsed time after the first estimating operation, and to perform a second estimating operation when the elapsed time after the first estimating operation becomes equal to a predetermined time length.

10. (Currently Amended) The fuel properties estimating apparatus as claimed in Claim 8, wherein the controller is configured to compare the fuel supply accumulated quantity with a second predetermined value, and to perform a second estimating operation after the first estimating operation when the fuel supply accumulated quantity ~~become~~ becomes equal to the second predetermined value.

11. (Original) The fuel properties estimating apparatus as claimed in Claim 1, wherein the component is alcohol, and the estimated component concentration is an estimated alcohol concentration in the fuel for the engine.

12. (Currently Amended) A fuel properties estimating process for an internal combustion engine, the fuel properties estimating process comprising:

performing a first estimating operation at a first estimating timing after an engine start of the engine, to determine an estimated component concentration of a component in a fuel for the engine in accordance with an actual air fuel ratio of the engine; and

performing a second estimating operation at a second estimating timing after the first estimating operation, to determine the estimated component concentration in accordance with the actual air fuel ratio of the engine[[.]],

wherein, in each of the first and second estimating operations, the estimated component concentration is calculated by using a characteristic in which the estimated component concentration is increased in proportion to an air-fuel ratio correction quantity which is determined from the air fuel ratio.

13. (Original) The fuel properties estimating process as claimed in Claim 12, wherein the fuel properties estimating process further comprises:

calculating a fuel supply accumulated quantity after the engine start; and

determining the first estimating timing by comparing the fuel supply accumulated quantity with a predetermined value.

14. (Currently Amended) A fuel properties estimating apparatus for an internal combustion engine, the fuel properties estimating process comprising:

means for determining a first estimating timing after an engine start of the engine;

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means for performing a first estimating operation at the first estimating timing, to determine an estimated component concentration of a component in a fuel for the engine in accordance with an actual air fuel ratio of the engine;

means for determining a second estimating timing after the first estimating timing; and

means for performing a second estimating operation at the second estimating timing after the first estimating operation, to determine the estimated component concentration in accordance with the actual air fuel ratio of the engine[[.]],

wherein, in each of the first and second estimating operations, the estimated component concentration is calculated by using a characteristic in which the estimated component concentration is increased in proportion to an air-fuel ratio correction quantity which is determined from the air fuel ratio.

15. (New) A fuel properties estimating apparatus for an internal combustion engine, the fuel properties estimating apparatus comprising:

an air-fuel ratio sensor configured to sense an actual exhaust air-fuel ratio of the engine; and

a controller configured:

to ascertain an air-fuel ratio feedback correction coefficient used for a feedback air-fuel ratio correction control, in accordance with the actual air fuel ratio of the engine,

to determine first and second estimating timings to perform a plurality of estimating operations to determine an estimated component concentration of a component in a fuel for the engine, after an engine start of the engine, and

to calculate the estimated component concentration from the air-fuel ratio correction coefficient at each of the first and second timings so as to increase the estimated component concentration with an increase in the air-fuel ratio feedback correction coefficient, by using a characteristic having a dead band to hold the estimated component concentration substantially constant without regard to variation in the air-fuel ratio correction quantity in a predetermined region of the air-fuel ratio correction quantity.